THE EFFECT OF INFRASTRUCTURE DEVELOPMENT ON ECONOMIC GROWTH IN INDONESIA

A THESIS

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DECLARATION OF AUTHENTICITY

Here i declare the originality of my thesis, I have not presented any other person for my bachelor's degree, nor have I presented any other person, or presented any other person's words, ideas, or expressions without acknowledgment. The bibliography of the thesis cites and lists all citations. If in the future it is proven that this statement is not true, I am willing to receive sanctions in accordance with applicable regulations or their consequences.

Yogyakarta, 12 March 2025

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MOTTO

"The closest people can betray you, broken hearts can be healed with love, ease comes after hardship, being sad does not equal being ungrateful, and people of patience have beautiful endings"

(Yusuf bin Ya'qub)

"In those moments when we do not think we are smart enough, or pretty enough, or skinny enough or successful enough, or basically just not enough, I had a woman say to me, 'just know you will never be enough, but you can know the value of your worth if you just put down the measuring stick'"

(Demi Moore)

DEDICATION

The author dedicated this thesis to:

1. The author's parents, Sandra, Ronald, and Jufrizal have given me the motivation to always fight without complaining.
2. Family and relatives who always support.
3. To someone who always gives me a support in my life named Aryasuta.
4. To all my respected lecturers who have given me miraculous insights
5. Faculty of Business and Economics, Indonesian Islamic University.
6. My friends who always help me complete this final assignment.

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Praise be to God, the author would like to say to Allah SWT who has bestowed all His blessings and guidance. I don't forget to send prayersand greetings to the great Prophet Muhammad SAW, his family, friends,and followers as well. The writing of this thesis was completed to complete the final assignment of the Undergraduate Program in the Department of International Development Economics, Faculty of Business and Economics, Islamic University of Indonesia. The title of this thesis is **"The Effect Of Infrastructure Development On Economic Growth In Indonesia"**. The author realizes that this thesis is far from perfection and there are still many errors, shortcomings, and oversights so The author expects corrective corrections, constructive criticism, and good suggestions for the perfection of this thesis.

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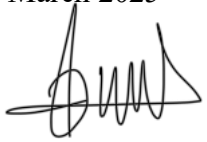
The author hopes that this thesis will be useful for all parties, especially for the alma mater of the Indonesian Islamic University Yogyakarta,

Aamiin.

Wassalamu'alaikum Warahmatullahi Wabarakatuh

Yogyakarta, March 2025



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ABSTRACT

Infrastructure development in Indonesia has a significant positive impact on economic growth and people's welfare. This study aims to analyze the impact of infrastructure development on economic growth in 34 Indonesian provinces in the 2020-2023 period. The dependent variable is economic growth, while independent variables are the physical special allocation fund, road length infrastructure, domestic investment, and household consumption that has telecommunication expenditure. This research method uses fixed effect panel data regression analysis using the Eviews 12 application. The results of this study indicate that the independent variables affect the dependent variable simultaneously. Physical special allocation funds, household consumption that have telecommunications expenditures, and domestic have a significant positive effect on economic growth. In contrast, road-length infrastructure have no effect on economic growth.

Keywords : *Economic Growth, Physical Special Allocation Fund, Road Length Infrastructure, Domestic Investment, Household Consumption With Telecommunication Expenditure*

CHAPTER I

INTRODUCTION

1.1 Background of the Problem

Infrastructure development in Indonesia has a significant positive impact on economic growth and people's welfare. Adequate infrastructure, such as toll roads, ports, airports, as well as energy and telecommunication networks, plays an important role in improving connectivity between regions, accelerating the distribution of goods and services, and attracting investment. With good infrastructure, production efficiency increases, logistics costs decrease, and the competitiveness of the national industry becomes stronger in the global market. One of the main indicators to measure the impact of infrastructure on the economy is the Gross Regional Domestic Product (GRDP), which reflects the ability of a region to manage resources to drive economic activity. Well-developed infrastructures allow remote areas to be better connected to economic centers, thus opening up new business opportunities, expanding the labor market, and increasing people's income.

In the context of endogenous growth theory, investment in physical capital, such as infrastructure, as well as human capital, plays an important role in driving long-term economic growth. The Indonesian government continues to accelerate infrastructure development through various strategic policies, including public investment schemes and partnerships with the private sector. With sustainable

development, Indonesia is not only able to increase economic growth, but also create a stronger foundation for long-term economic stability and equitable improvement of people's welfare. (Ma'ruf & Wihastuti, 2008). As a developing country, Indonesia continues to strive to improve people's welfare through economic development efforts. This economic development not only aims to increase national income, but also pays attention to aspects of equity, population growth, and the quality of human resources. Efforts are made to achieve this by increasing economic growth. Economic growth is one of the indicators in assessing the performance of an economy and assessing the results of economic development that has been carried out by the country (Kurniawan et al., 2021)

Infrastructure is often seen in the development of the transportation sector, such as road and bridge construction. However, it can also be seen in basic facilities in other sectors, such as the economy, education, and health. Increasing the quantity and quality of infrastructure, such as the expansion of access to proper transportation, the addition of equitable education and health facilities, as well as the construction of electricity, water, and telecommunications networks, will increase community productivity so that high economic growth can be achieved. Every year, both the central and local governments continue to carry out infrastructure development in various regions. However, budget allocations for infrastructure often fluctuate due to fiscal constraints, policy changes, and global and domestic economic conditions. Nevertheless, infrastructure development is still considered one of the main strategies for achieving economic equality, especially in areas that are still lagging behind in terms of accessibility and connectivity.

Various large-scale infrastructure projects have been launched, such as the construction of the trans-Java and trans-Sumatra toll roads, the development of the railway network, as well as increasing the capacity of ports and airports. Investments in the energy and telecommunications sectors also continue to be made to support industrial needs and improve the competitiveness of the national economy. However, the effectiveness of infrastructure development on economic growth is still debatable, given challenges such as inter-regional development inequality, budget utilization efficiency, and long-term project sustainability.

Infrastructure development in Indonesia from 2020 to 2023 has significantly impacted national economic growth. The government, through national strategic projects, focused on building toll roads, ports, airports, and other facilities to improve connectivity and logistics efficiency. These measures have succeeded in lowering the distribution costs of goods and services, thereby improving the competitiveness of domestic products.

In addition, domestic investment has increased, especially in the infrastructure sector and mineral processing industry. According to an article by the Ministry of State Secretariat, in 2022, Indonesia recorded a 44.2% surge in direct investment, with the

base metals sector being the biggest recipient. The main sources of investment came from Singapore, China, and Hong Kong. However, despite steady growth of around 5% per year, this figure is still below the set target. In 2024, economic growth reached 5.03%, slightly lower than the previous year's 5.05%. Factors such as global economic challenges and declining export demand affected this achievement. Overall, infrastructure development over the period has contributed positively to Indonesia's economic growth by improving efficiency, attracting investment, and creating jobs. However, external and internal challenges remain to be overcome to achieve higher and more sustainable growth.

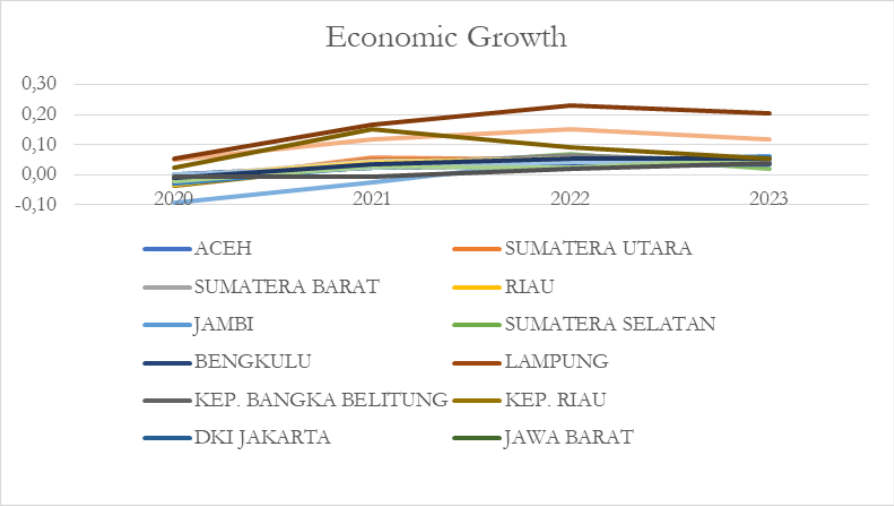

Figure 1. 1 Economic Growth (%)

Source: BPS, 2023 (Data processed using Excel)

Based on the graph of Gross Regional Domestic Product (GRDP) rates from 2020 to 2023, it can be seen that most regions experienced positive economic growth after 2020. This indicates a stable economic recovery in various regions, especially in North Sumatra, Riau, and Lampung, which have a higher growth trend than other regions. Infrastructure is the main indication and has a positive effect on the Gross

Regional Domestic Product (GRDP) rate.

The government has an important role in the distribution of infrastructure, one of which is regional financial independence which is reflected in the implementation of autonomy and can also be known through the ability of regional financial resources used to develop the region. Regional autonomy in Indonesia is implemented based on Law No. 22 of 1999 concerning Regional Government and Law No. 25 of 1999 concerning Financial Balance between Central and Regional Governments, which was later revised by Law No. 32 of 2004 concerning the latest Regional Government with Law No. 23 of 2014 and Law No. 33 of 2004 concerning Financial Balance between Central and Regional Governments.

An autonomous region must have the financial capacity to organize the government. Regions that have been independent are characterized by reduced financial dependence on the center. Increasing local revenue is one way to increase the financial capacity of local governments in financing routine and development expenditures. The greater the contribution of PAD to the APBD, the greater the ability of the region to implement autonomy. One of the APBN instruments in developing infrastructure is the Special Allocation Fund (Physical Special Allocation Funds).

Physical Special Allocation Funds is a form of specific grant, where the use of funds is based on the instructions or policies of the grantor (Central Government). Regions that receive Physical Special Allocation Funds must provide adjustment funds of at least 10% of the Physical Special Allocation Funds transferred to the region, and these adjustment funds must be budgeted in the regional budget

(APBD). However, regions with expenditures greater than revenues do not need to provide adjustment funds. However, it is important to note that not all regions receive Physical Special Allocation Funds because it is intended for equity and to improve the condition of physical infrastructure, which is considered a national priority.

The Special Allocation Fund (Physical Special Allocation Funds) is the government's main instrument in infrastructure development that plays an important role in driving economic growth in Indonesia. Through Physical Special Allocation Funds, the government allocates a special budget to regions to build infrastructure such as roads, bridges, irrigation, health facilities, and educational facilities. This development improves regional connectivity and accessibility, thereby facilitating the flow of transportation of goods and services and accelerating the distribution of production. In addition, adequate infrastructure creates a conducive environment for investment, encouraging the growth of the industrial, tourism, and trade sectors that have a direct impact on regional economic growth. With reduced logistics costs due to infrastructure improvements, the competitiveness of local products increases, accelerating economic growth and attracting more investment.

Infrastructure development through Physical Special Allocation Funds also absorbs a lot of labor and opens new business opportunities for the community, thereby increasing local income and economic welfare. This program also plays a role in reducing regional disparities by accelerating development in underdeveloped, frontier, and outermost (3T) areas, so that economic growth is not only concentrated in big cities but evenly distributed throughout the country. In addition to transportation infrastructure, Physical Special Allocation Funds also improves the

quality of public services through the construction of health and education facilities, which in turn improves the quality of human resources (HR) and labor productivity. With proper and transparent management, Physical Special Allocation Funds can continue to be the main driving force in creating a more advanced, inclusive, and highly competitive economy.

Road length infrastructure plays an important role in improving production efficiency to promote economic growth. First, through direct effects, infrastructure can reduce input costs in the production process, thereby lowering domestic prices and encouraging an increase in aggregate demand. This reduction in prices and increase in demand contribute to an increase in total factors of production as well as economic competitiveness. Second, through indirect effects, infrastructure can increase the productivity of input factors. High capital stock in infrastructure tends to encourage private capital investment and improve labor efficiency, thus contributing to increased output and efficiency in the production process (Yovani & Irfan, 2024).

Infrastructure is not only needed to improve the efficiency of economic activity. However, it also goes hand in hand with efforts to create a conducive environment for business growth. Good business growth will increase employment (Yovani & Irfan, 2024). However, this infrastructure development has not fully achieved equity in various regions. The allocation of infrastructure development must be adjusted to the priorities and needs of economic activity in a region. However, this infrastructure development has not fully achieved equity in various regions. The allocation of infrastructure development must be adjusted to the priorities and needs of economic activity in a region (Yovani & Irfan, 2024).

The importance of infrastructure availability is one of the things needed to achieve the expected economic growth. The availability of infrastructure is one of the most vital aspects in the process of accelerating national development. Infrastructure is believed to be one of the driving forces for economic growth (Syahputra et al., 2021). Good road infrastructure can save time, reduce production costs, and facilitate the distribution of goods and services, which can affect productivity efficiency and economic growth. Inadequate road conditions can hinder economic growth due to high logistics and transportation costs of total production costs (Yovani & Irfan, 2024).

In improving road length infrastructure, domestic investment (PMDN) plays an important role in infrastructure development. It provides a significant source of funding for road construction and maintenance. With domestic investment, the government can expand the road network and improve the quality of transportation infrastructure that supports inter-regional connectivity. Investment in road development supported by FDI helps strengthen connectivity between regions. Good roads facilitate the mobility of goods, services, and people, which in turn boosts local and national economic activity.

Based on Law No. 25 of 2007 concerning Investment Article 1, Paragraph 2 states that Domestic Investment is an investment activity to conduct business in the territory of the Republic of Indonesia carried out by domestic investors using domestic capital. Domestic Investment (PMDN) plays an important role in infrastructure development which has a positive effect on economic growth in Indonesia. Investments from domestic businesses in infrastructure projects, such as the construction of roads, ports, airports, and energy systems, help improve connectivity

between regions and the efficient distribution of goods and services. With better infrastructure, economic activity becomes smoother, logistics costs are reduced, and the competitiveness of domestic industries increases. In addition, infrastructure projects funded by PMDN also create jobs and encourage the growth of the construction sector and related industries, which in turn contribute to improving people's welfare. As domestic investment in the infrastructure sector continues to increase, Indonesia's economic growth can be more stable and sustainable.

The shift to an information society from an industrial society is due to the development of a global economy driven by technological advances characterized by increasing information and science on a daily basis (Oktaviani, 2020). The development of information technology is another important indicator in driving Indonesia's economic growth. The Information and Communication Technology Development Index (IP-ICT) is a tool to assess the development of information and communication technology (ICT) (Novalia, 2024). Household consumption with expenditure on telecommunications has a significant contribution to economic growth, especially in the context of national development that is increasingly focused on digitalization. Telecommunications has become a staple need for households in the modern era, not only for communication but also for education, employment, and access to other services. With the increasing penetration of information technology, household spending in this sector plays an important role in shaping national economic dynamics (Oktaviani, 2020).

Household spending on telecommunications reflects investment in technology that improves efficiency and productivity. Better access to telecommunications

services enables households to engage in digital economy activities, such as e-commerce, online learning, and remote working. These activities drive the growth of new economic sectors, create employment opportunities, and increase gross domestic income (GDP). In addition, telecommunications spending drives increased demand in related sectors, such as hardware (smartphones, computers) and digital infrastructure (internet networks, BTS towers). This creates a multiplier effect that impacts various sectors, broadening the base of national economic growth.

Telecommunications also promotes digital inclusion, enabling more individuals and communities to access information, financial services and educational opportunities. This is highly relevant to supporting national development, especially in remote and underdeveloped areas. With increased access, household consumption of telecommunications can narrow the digital and economic divide between regions.

From the background that has been described above, the subject matter that is the main discussion in this study is most important regarding the effect of infrastructure on economic growth in Indonesia In increasing economic growth in Indonesia by looking at the role of the government in allocating physical special allocation funds and domestic investment for the development of road length infrastructure and household consumption that has telecommunications expenditures to increase economic growth. So, in this study, the authors intend to conduct research with the title The Effect of Infrastructure Development on Economic Growth in Indonesia with the research objective of knowing the effect of physical Special Allocation Funds (DAK), road length infrastructure, domestic investment, and household consumption that has telecommunications expenditure on economic

growth in Indonesia based on 34 provinces from 2020 to 2023.

1.2 Problem Formulation

1. How does the simultaneous influence of Physical Special Allocation Funds, Road Infrastructure Length, Domestic Investment, and Household Consumption with Telecommunication Expenditures on Economic Growth in Indonesia from 2020 to 2023?
2. How does the Physical Special Allocation Fund affect Economic Growth in Indonesia from 2020 to 2023?
3. How does Road Infrastructure Length affect Economic Growth in Indonesia from 2020 to 2023?
4. How does Domestic Investment affect Economic Growth in Indonesia from 2020 to 2023?
5. How does household consumption of telecommunication expenditure affect economic growth in Indonesia from 2020 to 2023?

1.3 Research Objectives

1. Analyzing the simultaneous influence of Physical Special Allocation Funds, Road Infrastructure Length, Domestic Investment, and Household Consumption with Telecommunication Expenditures on Economic Growth in Indonesia from 2020 to 2023.
2. Analyzing the influence of Physical Special Allocation Funds on Economic Growth in Indonesia from 2020 to 2023.
3. Analyzing the influence of Road Infrastructure Length on Economic Growth

in Indonesia from 2020 to 2023.

4. Analyzing the influence of Domestic Investment on Economic Growth in Indonesia from 2020 to 2023.
5. Analyzing the influence of Household Consumption with Telecommunication Expenditures on Economic Growth in Indonesia from 2020 to 2023.

1.4 Research Benefits

1. This research is expected to provide new insights and experiences for the author regarding the impact of infrastructure and the role of the government in influencing economic growth.
2. This research is expected to serve as evaluation material for implemented policies and as a reference for future considerations in determining the best policies for addressing the impact of infrastructure on economic growth.
3. This research is expected to be a valuable reference for future studies on the impact of infrastructure on economic growth.

CHAPTER II

LITERATURE REVIEW

2.1 Literature Review

Infrastructure development is one of the main factors in driving a country's economic growth, including in Indonesia. Adequate infrastructure, such as transportation networks, energy, telecommunications, and other public facilities, plays a role in increasing production efficiency, facilitating the distribution of goods and services, and encouraging investment activities. Various studies show that the availability of good infrastructure not only increases the competitiveness of a region but also creates employment opportunities and encourages the development of other economic sectors.

In the context of economic growth, infrastructure is the basic capital that supports various industrial sectors, both small and large scale, to develop optimally. The Indonesian government continues to improve infrastructure development to create a conducive investment climate and accelerate connectivity between regions. This aims to reduce economic inequality and promote equitable development. Thus, a study on the effect of infrastructure on economic growth is important to understand the extent of the impact of investment in this sector on the national economy.

In writing this thesis, researchers try to explore information from several previous research journals as comparison material, both regarding existing

shortcomings or advantages. In this literature review, the author will take several previous studies that discuss the effect of physical special allocation funds, road length infrastructure, domestic investment, and household consumption that has telecommunications expenditures on economic growth.

Fauzyni (2013) conducted research on the Analysis of the Effect of Local Revenue (Pad), Special Allocation Fund (Physical Special Allocation Funds), Revenue Sharing Fund (Dbh) Tax / Non-Tax on Economic Growth in Regency / City of Central Java Province in 2003-2011. This study uses panel data and the Least Square Dummy Variable (LSDV) analysis tool or also known as the Fixed Effect Model (FEM). The study results show that there is an effect of fiscal decentralization in Central Java province. This means that when the degree of fiscal decentralization is not too high, the fiscal decentralization policy will have a positive influence on economic growth. However, when the degree of fiscal decentralization is too high, the fiscal decentralization policy will actually hamper economic growth.

Rizky et al. (2016)researched the Effect of Foreign Investment, Domestic Investment and Capital Expenditure on Provincial Economic Growth in Indonesia. Panel data regression analysis method with Fixed Effect model. The results of this study indicate that foreign investment, domestic investment, and capital expenditure have a positive and significant effect on provincial economic growth in Indonesia from 2010-2013 partially and simultaneously.

Yovani & Irfan (2024) conducted research on the Analysis of the Effect of Infrastructure on Economic Growth in West Sumatra. The analysis used is panel data

regression analysis with Fixed Effect Model. The results showed that partially road infrastructure and telecommunications infrastructure have a positive and significant effect on economic growth in West Sumatra. Meanwhile, the effect of road and telecommunications infrastructure simultaneously has a significant effect on economic growth in West Sumatra.

Table 2. 1 Literature Review

Name	Research Objectives	Findings
Oktaviani (2020)	To determine the influence of the number of internet users, mobile phone subscribers, and household consumption for telecommunications on economic growth in Indonesia.	The number of internet users and household consumption of telecommunications have a positive and significant effect, while the number of mobile phone subscribers has a positive but not significant effect on economic growth in Indonesia.
Angelina & Wahyuni(2021)	To analyze the impact of economic and social infrastructure on economic growth in Indonesia.	Infrastructure variables have a positive and significant effect on economic growth in Indonesia from 2015 to 2019.
Kurniawati & Islami(2022)	To analyze the effect of Foreign Direct Investment (FDI), Domestic Investment (DI), and Oil & Gas and Non-Oil & Gas Exports on Indonesia's economic growth.	Foreign Direct Investment (FDI) and Domestic Investment (DI) have a significant impact in both the short and long term, while Oil & Gas and Non-Oil & Gas Exports do not have a significant effect.
Alifah & Kurniawati(2024)	To examine the effect of regional revenue, general allocation funds, special allocation funds, regional taxation, and capital expenditure on economic growth in the districts/cities of the former Surakarta Residency.	General allocation funds and special allocation funds affect economic growth, while regional original revenue, regional taxes, and capital expenditure do not have an effect.

2.2 Theoretical Foundation

2.2.1 Economic Growth

Economic growth is an important indicator in assessing the performance of an economy. One measure commonly used to observe economic growth is the rate of Gross Regional Domestic Product (GRDP). GRDP reflects the total value of goods and services produced by a region within a certain period of time so that it can provide an overview of productivity and economic activity in the region (Kurniawan et al., 2021). Infrastructure development has a very important role in driving a country's economic growth because adequate infrastructure can increase economic efficiency, accelerate the mobility of goods and services, and create a conducive environment for investment and other economic activities.

According to Prof. Simon Kuznets, economic growth is the long-term increase in a country's capacity to provide a variety of goods and services to its population. This increase is made possible by technological advances, institutional adjustments, and ideological adaptations to evolving conditions. Infrastructure plays an important role in supporting these factors by increasing production efficiency, expanding access to markets, and accelerating technology adoption. Adequate infrastructure also promotes institutional reform by improving public services and ease of investment and aids ideological adaptation through increased economic inclusion and public welfare. Thus, strategic and sustainable infrastructure investment is essential to support long-term economic growth in accordance with Kuznets' theory. This process involves

continuous change, sustained increases in per capita income, and institutional reforms in various fields, including economic, political, legal, social, and cultural. Institutional reform can be seen from two main aspects: organizational improvement (institutions) and regulatory improvement, both in the form of formal laws and informal rules (Ma'ruf & Wihastuti, 2008).

In another theory that discusses economic growth, Todaro (2000: 137) states that economic growth is influenced by three main factors. First, capital accumulation which includes all forms of investment allocated to physical assets such as land, equipment, and human resources. Second, population growth which in a certain period of time will contribute to an increase in the number of workers. Third, technological advancement is an important element in increasing productivity. Infrastructure plays an important role in supporting these three factors, making them crucial elements in promoting sustainable economic growth. In terms of capital accumulation, infrastructure such as roads, ports, electricity, and telecommunications are forms of physical investment that increase the productivity of other economic sectors. Good infrastructure can facilitate the distribution of goods and services, reduce production costs, and create an attractive environment for private and public investment.

2.2.2 Physical Special Allocation Funds

Economic development is an active effort by a country to increase the per capita income of its population. Therefore, the success of economic development requires active participation from various elements, including the community, government, and all stakeholders in the country. Good collaboration between all

parties is key to create sustainable economic growth and development (Kurniawan et al., 2021). Adequate infrastructure, such as transportation networks, energy, telecommunications, and other public facilities, can improve connectivity between regions, facilitate the distribution of goods and services, and expand people's access to economic opportunities. With good infrastructure support, a collaboration between various parties becomes more effective, as the ease of access and connectivity allows for a more optimal flow of information, investment, and labor.

The government, as the main actor in infrastructure provision, has a role in designing policies that encourage inclusive and sustainable infrastructure development. Meanwhile, the private sector can contribute through investments in infrastructure projects that improve the competitiveness of the national economy. Communities also have an important role in supporting and utilizing available infrastructure to improve their productivity and welfare. In addition, quality infrastructure can also create new jobs, support the growth of small and medium enterprises (SMEs), and encourage innovation in various economic sectors.

According to Adam Smith, the government has an important role in supporting the economy through three main functions. First, maintaining domestic security and defense to ensure stability and protection of society. Second, it organizes a fair and effective justice system to uphold the law and protect individual rights. Third, providing public goods and services, such as infrastructure and public facilities, that cannot be adequately provided by the private sector. To perform these functions, the government requires a budget that is managed through fiscal policy. This policy reflects the size, growth, and structure of the state budget, which becomes the foundation in

supporting economic growth and public welfare (Ma'ruf & Wihastuti, 2008).

Fiscal policy is government policy with respect to the level of government purchases, transfers, and tax structures. Fiscal policy can also be understood as an economic policy carried out by the government through increasing or decreasing state revenues and or state expenditures in order to achieve certain goals. The scope of the policy is in the government expenditure and tax revenue sectors so it is also referred to as budget policy. In general, the objectives of fiscal policy to be achieved are increasing national income, increasing employment opportunities, reducing the inflation rate, reducing the trade balance deficit, and reducing the international balance of payments deficit. Fiscal policy has 3 main functions. First, the allocation function, which is the provision of social goods or the process of dividing overall resources to be used as private and social goods and how the composition of social goods is determined. Second, the distribution function is an adjustment to the distribution of income and wealth to ensure the fulfillment of what is considered by society to be a fair and equitable distribution situation. Third, the stabilization function as a tool to maintain a high level of employment opportunities, a proper level of stability, and an appropriate growth rate by taking into account its impact on trade and the balance of payments (Ma'ruf & Wihastuti, 2008).

In implementing fiscal decentralization, it is expected that there will be an increase in economic growth in the regions. Based on the Tiebout Model theory which is the basis for the concept of fiscal decentralization, the delegation of authority will increase the ability of regions to serve the needs of public goods better and more efficiently (Fauzyni, 2013). The fundamental reason for this increased ability is that

local governments are considered to know the needs and characteristics of local communities better so that programs from government policies will be more effective to run as well as from the side of public budgeting, the concept of efficiency will emerge because it is appropriate and effective (Sumarsono and Utomo, 2009: 53) According to Prawirosetoto (2002), fiscal decentralization is the delegation of responsibility and the distribution of power and authority for decision making in the fiscal field which includes aspects of revenue (tax assignment) and aspects of expenditure (expenditure assignment). Fiscal decentralization is associated with the duties and functions of local governments in the provision of public goods and services (Fauzyni, 2013).

The main components of fiscal decentralization include Local Own Revenue (PAD), which reflects the regions' independence in managing local resources; the General Allocation Fund (DAU), a general fund transfer to reduce fiscal disparities among regions; and Special Allocation Fund (Physical Special Allocation Funds), a specific fund to support national priority programs such as infrastructure, education, and health. With fiscal decentralization, regions are expected to effectively improve economic growth and the quality of public services. According to the new laws (Law No. 32/2004 and Law No. 33/2004), regions receiving Physical Special Allocation Funds must provide adjustment funds of at least 10% of the Physical Special Allocation Funds transferred to the region, and these adjustment funds must be budgeted in the regional budget (APBD). However, regions with expenditures greater than revenues do not need to provide adjustment funds. However, it should be noted that not all regions receive Physical Special Allocation Funds because

Physical Special Allocation Funds

aims for equity and to improve the condition of physical infrastructure, which is considered a national priority (Alifah & Kurniawati, 2024).

2.2.3 Road Length Infrastructure

Infrastructure plays an important role in facilitating economic activities in a country, which ultimately impacts economic growth. Better infrastructure can reduce transaction costs, expand market access, and increase people's income. According to the Big Indonesian Dictionary (KBBI), infrastructure is defined as infrastructure. The availability of infrastructure is a crucial element in the economic development of a region and also plays a role in accelerating the process of national economic development. Infrastructure is considered the main driver of economic growth (Syahputra et al., 2021). Infrastructure can be divided into seven categories, namely:

1. Transportation infrastructure, such as roads and bridges
2. Transportation service infrastructure, such as airports, terminals, and ports
3. Communication infrastructure
4. Irrigation infrastructure, including irrigation systems, water disposal, and waterways (rivers, water pipes)
5. Building infrastructure
6. Energy distribution and production infrastructure
7. Waste treatment infrastructure

Based on Presidential Regulation No. 38/2015, infrastructure is defined as technical, physical, system, hardware, and software facilities that serve the needs of society while supporting the network structure for optimal economic and social growth. Economic infrastructure includes physical assets that support economic activities, both for production and consumption, such as public utilities (telecommunications, clean water, electricity), public works, and transportation sectors (e.g. roads). Meanwhile, social infrastructure includes facilities that support people's health and skills, such as education, health services (hospitals and health centers), housing, and recreational areas (Angelina & Wahyuni, 2021). The availability of adequate infrastructure has a significant positive impact on economic growth (Ramirez and Esfahani, 1999). According to the World Bank (1994), infrastructure is the main driver of economic activity and a key factor in accelerating the rate of economic growth. Conversely, the lack of infrastructure can be a significant obstacle to the economic development of a region (Angelina & Wahyuni, 2021).

Road infrastructure is a land transportation infrastructure that includes all parts of the road, including complementary buildings and equipment intended for traffic on the surface of the land, below the surface of the land and / or water, and above the surface of the water, except railways, lorry roads, and cable roads (Syahputra et al., 2021). The existence of good roads is a basic requirement that must be met to support the growth of an urban area. In addition, roads aim to support the mobility of goods and passengers between the city center and industrial and service areas, offices, and residential and residential areas and hinterland areas (Syahputra et al., 2021). Roads also aim to support the function of the city as a growth center and encourage equitable

development within the city as well as links to its hinterland (Sjafrizal, 2012).

2.2.4 Domestic Investment

The Harrod-Domar theory of economic growth is one of the modern growth theories that evolved from Keynes' short-term macroeconomic theory into a long-term macroeconomic theory. According to Harrod and Domar, investment spending (I) affects not only aggregate demand (AD), but also aggregate supply (AS) through its impact on production capacity. In a longer time frame, investment serves to increase the capital stock (K). Harrod-Domar argues that any addition to the capital stock will increase society's capacity to produce output. The output in question is the potential output that can be produced with the available capital stock. However, the achieved output is not always the same as the potential output, as it is affected by the level of aggregate demand (Ma'ruf & Wihastuti, 2008).

In the context of economic growth, PMDN has several positive effects. First, it can increase production capacity and create jobs, which in turn will increase people's per capita income. Secondly, with domestic investment, new technologies and innovations applied can increase efficiency and productivity in economic sectors. Third, investment in infrastructure and key sectors will increase the country's economic competitiveness and reduce dependence on foreign investment. Based on Law No. 25 of 2007 concerning Investment Article 1, Paragraph 2 states that Domestic Investment is an investment activity to conduct business in the territory of the Republic of Indonesia carried out by domestic investors using domestic capital (Rizky et al., 2016).

Based on the endogenous growth theory, FDI can accelerate economic growth by increasing investment in physical capital and human capital that drives innovation and long-term productivity. The Harrod-Domar model also emphasizes that economic growth depends on the level of savings and investment, where high FDI can expand national production capacity and increase economic output. Moreover, in the Solow-Swan neoclassical growth theory, FDI contributes to domestic capital accumulation that can improve labor efficiency and accelerate the adoption of new technologies. The multiplier effect is also an important impact of FDI, where an increase in domestic investment can lead to an increase in people's income, consumption, and aggregate demand, which in turn strengthens the economic growth cycle. With strong domestic investment, local industries have greater opportunities to expand, create new jobs, and reduce dependence on foreign investment, resulting in a more stable and sustainable national economy. Therefore, PMDN is one of the main pillars in the economic development strategy that aims to improve people's welfare and create inclusive and sustainable economic growth.

2.2.5 Household Consumption with Telecommunication Expenditure

A country's economic growth is highly dependent on its ability to manage and utilize evolving technology optimally and sustainably. Schumpeter, an economist, argued that innovation is one of the main factors driving long-term economic growth (Todaro, 2000). Innovation includes the application of knowledge and technology in everyday life, which can accelerate economic progress and improve the country's competitiveness (Novalia, 2024).

Mankiw (2006) argues that technological progress can increase the

effectiveness and efficiency of labor, which in turn will encourage increased production. Rapid technological development enables sustainable economic growth, along with an increase in the output produced. The increase in output is highly dependent on technological progress. The Information and Communication Technology (ICT) sector has a significant impact on a country's economic growth. With the adoption of efficient information technology and rapid communication, the business world and national economy can develop more rapidly and efficiently. The internet and digital applications enable businesses to access global markets. In addition, ICT supports innovation, facilitates foreign investment, and creates new jobs in the technology sector. Therefore, a high ICT development index can increase productivity, competitiveness, and ultimately accelerate a country's economic growth (Oktaviani, 2020).

Nour (2002) states that telecommunications has a positive impact on economic growth and development, which can be seen from both the demand and supply sides. In terms of demand, telecommunications can increase new products and services, while from the supply side, telecommunications can optimize production factors in economic activities. Graham et al. (2017) argue that in developing countries, households own more cellular phones than access to clean water and electricity. As the number of internet and mobile phone users increases every year, Indonesia, which has a growing population, will experience an increase in telecommunications consumption, which in turn can drive economic growth. While the impact of the telecommunications sector may not be as large as other sectors, it still plays an important role in driving economic growth. Good telecommunications infrastructure facilitates quick and easy

access to information, allows businesses to operate more efficiently, and expands markets for goods and services. In addition, advanced telecommunications technology encourages innovation and business development, especially in technology-based sectors, which in turn opens up new employment opportunities. Therefore, a rapidly growing telecommunications sector can increase economic growth through easy access to information and support for business activities (Hulu & Wahyuni, 2021).

2.3 Relationship Amount Variable

2.3.1 Relationship Amount Physical Special Allocation Funds And Economic Growth

The Physical Special Allocation Fund (Physical Special Allocation Funds) plays an important role in influencing the economic growth of a region. Physical Special Allocation Funds is a fund allocated by the central government to local governments to finance physical and infrastructure activities, such as the construction of roads, bridges, irrigation, and other public facilities. With these funds, better quality infrastructure will be created, which in turn can improve connectivity between regions, increase transportation efficiency, and facilitate access to markets, both for the production sector and consumers. Better infrastructure can also lower transaction costs, encourage investment, and improve regional productivity and competitiveness. This is in line with research by Alifah and Kurniawati (2024), which states that an increase in the Special Allocation Fund will result in significant economic development. This is because most of the Physical Special Allocation Funds is set aside for education and health facilities, which are likely to be prioritized by local governments this year. Physical Special Allocation Funds is

associated with things that directly drive economic growth, such as roads and bridges. Relationship Amount Road Length Infrastructure And Economic Growth

2.3.2 Relationship Amount Domestic Investment And Economic Growth

Infrastructure, especially road length, has a relationship with the economic growth of a region. Roads, as part of transportation infrastructure, play an important role in connecting various regions, facilitating the distribution of goods and services, and improving accessibility to markets, economic centers, and resources. Increasing the length of well-connected roads can lower transportation costs, reduce travel time, and optimize the flow of goods and people, which in turn supports more efficient economic activity. This is in line with Yovani & Irfan's research (2024) on road infrastructure economic growth in West Sumatra.

2.3.3 Relationship Amount Household Consumption with Telecommunication Expenditure And Economic Growth

Increased household expenditure on telecommunications, such as the use of cellular phones and the internet, indicates better access to information and communication technology (ICT). This allows people to communicate faster, access information easily, and facilitate more efficient business transactions. Consumers who are more connected through telecommunications services can increase their productivity, both in daily activities and in economic activities, such as trade, education, and remote work. This is in line with Novalia's research (2024) which states that the more household consumption for telecommunications will be more influential in encouraging economic growth, because the telecommunications sector can improve fast access facilities in delivering information and can support business or business

activities so that economic growth will also increase.

Based on the description of the literature review and theoretical basis above, it is known that the variables of physical special allocation funds, road length infrastructure, domestic invesment, and household consumption for telecommunication expenditure have a relationship with economic growth. However, previous studies are still limited in explaining how infrastructure affects economic growth specifically. In addition, this study is a combination of previous research variables.

2.4 Hypothesis

Based on the theoretical framework and various literature reviews that have been discussed, as well as the analysis of the relationship between the dependent and independent variables, this study is based on the following hypotheses:

1. It is suspected that, simultaneously, the Physical Special Allocation Fund, Road Infrastructure Length, Domestic Investment, and Household Consumption with Telecommunication Expenditures influence economic growth in Indonesia from 2020 to 2023.
2. It is suspected that the Physical Special Allocation Fund has a positive effect on economic growth in Indonesia from 2020 to 2023.
3. It is suspected that Road Infrastructure Length has a positive effect on economic growth in Indonesia from 2020 to 2023.
4. It is suspected that Domestic Investment has a positive effect on economic growth in Indonesia from 2020 to 2023.

5. It is suspected that Household Consumption with Telecommunication Expenditures has a positive effect on economic growth in Indonesia from 2020 to 2023.

2.5 Theoretical Framework

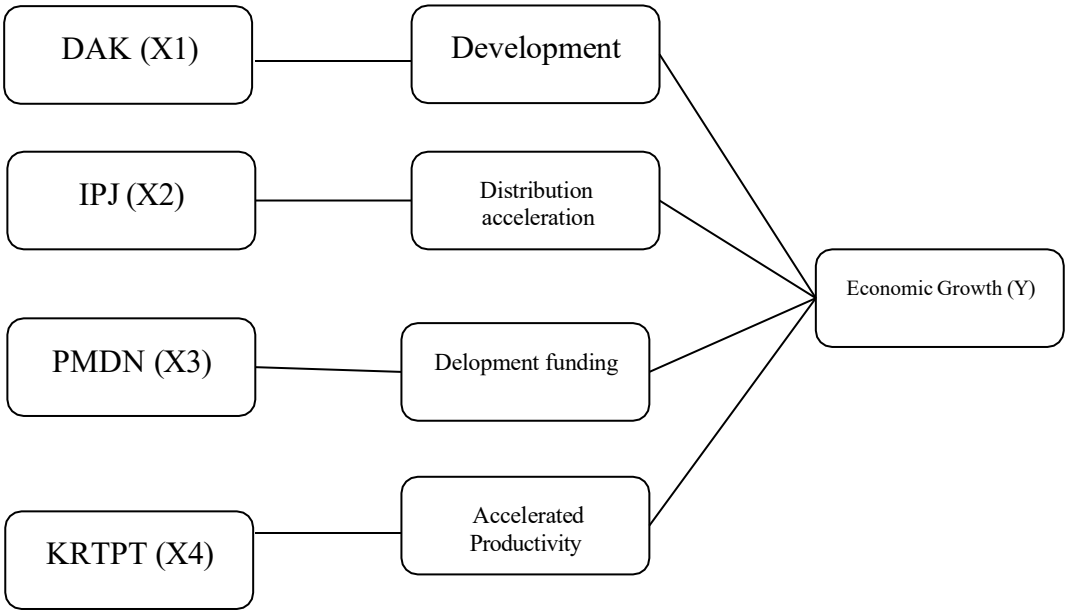

Figure 2. 1 Theoretical Framework

CHAPTER III

RESEARCH METHODOLOGY

3.1 Type of Research and Data Collection Methods

This research uses a quantitative approach. Quantitative research is a type of research that utilizes numbers as a measuring tool to examine a particular object (Widarjono, 2018). This approach applies a deductive mindset, which starts with general concepts and then breaks down into more specific or detailed ones. The main objective of quantitative research is to test previously formulated hypotheses. This method utilizes data in the form of nominal numbers and statistical analysis to answer questions or achieve research objectives (Widarjono, 2018).

This study uses secondary data, namely data obtained by other parties collected at a certain time from a sample. This study uses panel data regression. Panel data regression is a statistical analysis method used to estimate the relationship between the dependent variable and the independent variable using data that has cross-section dimensions (various individuals, companies, or regions) and time series (a certain period of time). This method combines information from these two dimensions so that it can provide more accurate estimation results than regression of cross-section or time-series data alone. The data in this study are sourced from:

a. Central Bureau of Statistics (BPS)

b. Directorate General of Fiscal Balance

c. Other sources that support this research

3.2 Operational Definition of Variables

Research variables are concepts that can be measured with various values to provide an overview of the phenomenon under study. In this study, the variables are divided into two, namely the dependent variable (bound) and the independent variable (free). In this study, one dependent variable and four independent variables were used.

3.2.1 Dependent Variables (Y)

The dependent variable can be said to be the influenced variable (Widarjono, 2018). The variable in this study is the rate of GRDP, the GRDP rate is the rate of economic growth as measured by the percentage change in the total value of goods and services produced by a region within a certain period of time (usually one year). This variable reflects the dynamics of the regional economy and is the main indicator in evaluating the economic development of a region. This study uses the GRDP rate in 34 provinces from 2020 to 2023 with units of percent (%) and data obtained from the Central Statistics Agency (BPS) .

3.2.2 Independent Variable (X)

Independent variables can be said to be variables that affect the size of the dependent variable. The independent variables in this study are divided into 4, namely:

a) Physical Special Allocation Funds

The physical special allocation fund is a budget allocated by the central

government to local governments to fund the development of infrastructure and physical facilities according to national priorities that require intervention at the regional level. This variable measures the amount and influence of funds received by a region in supporting specific physical development. This study uses physical special allocation fund variables in 34 provinces from 2020 to 2023, with units of thousands IDR and data obtained from the Directorate General of Fiscal Balance.

b) Road Length Infrastructure

Road length infrastructure refers to the total length of roads available in an area in a certain period. This variable is used to measure the capacity of land transportation infrastructure to support economic activity, population mobility, and distribution of goods and services. This study uses road length infrastructure in 34 provinces from 2020 to 2023 with units of kilometres and data obtained from the Central Statistics Agency (BPS).

c) Domestic Investment

Domestic Investment (PMDN) is the value of investments made by individuals, business entities, or governments originating from within the country to fund business activities in the territory of Indonesia. This variable is used to measure the contribution of domestic investment in supporting economic growth and regional development. This study uses domestic investment in 34 provinces from 2020 to 2023 with units of billion IDR and data obtained from the Central Statistics Agency (BPS).

d) Household Consumption with Telecommunication Expenditure Consumption of households with telecommunication expenditure

Refers to the amount of household expenditure on telecommunication services, including communication costs such as telephone, internet, subscription television, and other data services. This variable is used to measure the contribution of telecommunication sector expenditure to household consumption patterns and its impact on the economy. This study uses the consumption of households that have telecommunications expenditures in 34 provinces from 2020 to 2023 with IDR units and data obtained from the Central Bureau of Statistics (BPS).

3.3 Analysis Method

3.3.1 Panel Regression Method

Panel data regression analysis is an analysis of the relationship between variables carried out by different economic units and various different time periods (Widarjono, 2018). The advantage provided by panel data regression analysis is that one of them provides a greater variety or amount of data. So with more data, it will avoid collinearity problems and produce greater degrees of freedom.

In estimating the regression model, there can be three approaches, namely, Common Effect Model, Fixed Effect Model and Random Effect Model. To be able to estimate these various models, researchers use the Eviews 12 application.

3.3.1.1 *Common Effect Model (CEM)*

A model that explains that the characteristics or behavior between companies are the same at various times, this model is known as the Common Effect Model. According to Widarjono (2018), the Common Effect Model estimation model is a simple technique for estimating panel data regression by only combining

time series and cross-section without regard to individual dimensions and time. This approach can use the OLS method to estimate the panel data model. In this approach, the data behavior between individuals is the same in various time periods. The following is the regression equation for the Common Effect Model approach:

$$Yit = \beta 0 + \beta 1 LogX1it + \beta 2 LogX2it + \beta 3 LogX3it + \beta 4 LogX4it + eit$$

In this study, the application of logs to each variable aims to overcome various problems that may arise when testing data. The use of logs on variables can help overcome data values or variations that are too large (Ghozali, 2005). Thus, the logarithms on these variables make the data variation more uniform and simplify the estimation process of regression coefficients.

3.3.1.2 *Fixed Effect Model (FEM)*

There is an estimation model that says that the characteristics between companies have differences by paying attention to intercepts; this model is known as the Fixed Effect Model. Fixed Effect Model, according to Widarjono (2018), is one of the regression estimation model techniques that uses dummy variables to capture intercept differences between individuals. The difference in intercepts using dummy variables to be able to see it, this model applies the Least squares Dummy Variables (LSDV) method. The following is the regression equation of the fixed effect model:

$$Yit = \alpha i + \beta_1 LogX_1it + \beta_2 LogX_2it + \beta_3 LogX_3it + \beta_4 LogX_4it + eit$$

3.3.1.3 *Random Effect Model (REM)*

As a result of not knowing the actual model ,the inclusion of dummy

variables creates a problem in panel data regression analysis. According to Widarjono (2018), this existing problem comes as a result of the previous fixed effect model and can be overcome by the disturbance variable or error term, this technique is known as the random effect model. The existence of a disturbance variable relationship in the model, the estimation method used in the random effect model is Generalized Least Squares (GLS). The regression equation of the random effect model is as follows:

$$Yit = \alpha i + \beta_1 LogX_1 it + \beta_2 LogX_2 it + \beta_3 LogX_3 it + \beta_4 LogX_4 it + ui + eit$$

3.3.2 Selection of the Best Model

After estimating panel data regression into several estimation model approaches such as the Common Effect Model, Fixed Effect Model, and Random Effect Model. Based on the three model approaches, we must be able to determine the best model approach for estimating panel data regression. In order to determine the best model approach we can do the following tests

a) Chow Test

The Chow-Test test aims to test, compare, and select the best model between Common Effect and Fixed Effect in the context of panel data regression. The steps taken in the Chow-Test are as follows:

Estimating the Fixed Effect model using the Chow-test, the goal is to see the probability value of F and Chi-square assuming:

1. If the probability value of F and Chi-square> α = 5%, then the panel data regression test uses the Common Effect model.

2. If the probability value of F and Chi-square < α = 5%, then the panel data regression test uses the Fixed Effect model.

Alternatively, this F Test can be done by formulating the following hypothesis:

H0: Common Effect (CE) H1: Fixed Effect Model

H0: rejected if the value of F count> F table or it can also be with: H0: rejected if the probability value F < α (with α 5%)

The F-test process involves examining the probability value (Prob.) on the Cross-section F. If the probability value exceeds 0.05, which is specified as the significance level (alpha), then the Common Effect Model (CEM) is selected. Conversely, if the probability value is below 0.05, then the Fixed Effect Model (FEM) is selected as the appropriate model.

If the Chow-Test result shows that the Common Effect model is more suitable, panel data regression can be performed directly using the model.

However, if the Fixed Effect model is selected, the next step is to conduct a Hausman Test to determine whether Fixed Effect or Random Effect is more suitable for use in panel data regression analysis.

b) Hausman Test

The Hausman test is conducted to compare and select the best model between Fixed Effects and Random Effects that will be applied in panel data regression analysis. The steps taken in the Hausman-test are as follows:

Estimating the Random Effect model using the Hausman-test, the goal is to see the probability value of F and Chi-square by assuming:

1. If the probability value of F and Chi-square> α = 5%, then the panel data regression test uses the Random Effect model.
2. If the probability value of F and Chi-square < α = 5%, then the panel data regression test uses the Fixed Effect model. Testing can be done by formulating the hypothesis as follows: H0: Random Effect Model

   H1: Fixed Effect Model

   H0 is rejected if the P-value is smaller than the α value.

   H0 is accepted if the P-value is greater than the α value. The α value used is 5%.

The assessment of the Hausman test is based on the probability value of the Random Effect model on the cross-section. If the probability value of the Hausman test is less than 5%, then the null hypothesis (Ho) is rejected, so that the Fixed Effect model is declared more suitable for regression analysis. Conversely, if the probability value is more than 5%, the alternative hypothesis (Ha) is accepted, which indicates that the Fixed Effect model is not appropriate for use.

3.3.3 Hypothesis Testing:

In assessing the ability of the regression function to estimate actual values, model feasibility testing is carried out. This study involves three stages hypothesis testing, namely partial test (t-test), simultaneous test (F-test), and coefficient of determination (R^2) test, which are explained as follows:

a) F Test

The use of the F test aims to evaluate the ability of the independent variables to

simultaneously explain the dependent variable. This test is conducted to ascertain whether all the independent variables analyzed have a significant effect on the dependent variable. Ghozali (2005) states that testing can be done as follows:

1. Ho is accepted and Ha is rejected, if the significant probability of F>

   0.1 or F-count < F table

2. Ho is rejected and Ha is accepted, if the significant probability of F <

   0.1or F-count> F table

b) t-statistik test

The t-statistical test is carried out to test the partial impact of the independent variables on the independent variables. This t-statistical test shows how far the influence of each independent variable individually in explaining the variation in the dependent variable. Ghozali (2005) states that the test can be done as follows:

1. Ho is accepted and Ha is rejected, if significant probability t > 0.1 or t-count < t-table
2. Ho is rejected and Ha is accepted, if the significant probability of t <

   0.1 or t-count> t-table

c) Coefficient of Determination

The coefficient of determination (R^2) is used to measure the extent to which the model is able to explain the dependent variable. The R^2 value ranges from zero to one ($0 < R^2 < 1$). The closer to one, the greater the contribution of the independent variables in providing the information needed to predict the dependent variable.

Conversely, a low R^2 value indicates that the independent variables have a limited ability to explain variations in the dependent variable. However, R^2 has the disadvantage of being biased towards the number of independent variables in the model. The addition of independent variables, although insignificant, will still increase the R^2 value. Therefore, this study uses adjusted R^2 to overcome this bias. The higher the adjusted R^2 value, especially if it is close to one (1), the better the model's ability to explain the dependent variable Ghozali (2005).

CHAPTER IV

RESULT AND DISCUSSION

4.1 Statistical Descriptive Analysis

This analysis will present the research data related to the use of research variables. The data used is secondary data taken from the Central Bureau of Statistics. The variables in this study include economic growth, physical special allocation funds, road length infrastructure, domestic investment, and household consumption that has telecommunications expenditure in 34 Indonesian provinces. The following are the results of the description of the data used in the study.

Table 4. 1 Descriptive Statistics

Variabel	Y1 (PE)	X1(PHYSICAL SPECIAL ALLOCATION FUNDS_FISIK)	X2 (IPJ)	X3 (PMDN)	X4 KRTPT
Mean	3.535074	3.01E+08	15967.70	15337.13	5349587.
Maximum	22.94000	1.02E+09	42521.00	95202.10	10665373
Minimum	-9.340000	4168977.	4338.000	252.9000	3745547.
Std. Dev.	4.267231	1.54E+08	10099.95	20023.73	1115634.
Observations	136	136	136	136	136

Source: Processed data by eviews 12

4.1.1 Economic Growth

Based on Table 4, the maximum value of the GRDP rate is 22.94% in North Maluku Province in 2022. The minimum value is -9.34% in Bali Province in 2020. The average GRDP rate is 3.53% with a standard deviation of 4.26%, which is greater than the average value. It can be interpreted that the data is quite varied

4.1.2 Physical Special Allocation Funds

Based on Table 4, the maximum value of the physical special allocation fund was 1,020,000,000 thousand IDR in East Java Province in 2021, and the minimum value was 4168977 thousand IDR in DKI Jakarta Province in 2023. The average physical special allocation fund was 301,000,000 thousand IDR, with a standard deviation of 154,000,000 thousand IDR, which is lower than the average. This suggests that the data is less varied.

4.1.3 Road Length Infrastructure

Based on Table 4, the maximum value of road length infrastructure is 42521 km in East Java Province in 2021. The minimum value is 4338 km in DI Yogyakarta Province in 2020 and 2021. The average road length infrastructure is 15967.70 km with a standard deviation of 10099.95 km which is lower than the average. It can be interpreted that the data is less varied

4.1.4 Domestic Investment

Based on Table 4, the maximum value of domestic investment is 95202.10 billion IDR in DKI Jakarta Province in 2023. The minimum value was 252.9 billion IDR in West Sulawesi Province in 2020. The average domestic investment is 15337.13

billion IDR with a standard deviation of 20023.73 billion IDR which is greater than the average. It can be interpreted that the data is quite varied.

4.1.5 Household Consumption with Telecommunication Expenditure

Based on Table 4, the maximum value of household consumption that has telecommunication expenditure is 10665373 IDR in DKI Jakarta Province in 2023. The minimum value was 3745547 IDR in West Sulawesi Province in 2021. The average consumption of households that have telecommunications expenditure is 5349587 IDR with a standard deviation of 1115634 IDR, which is lower than the average. It can be interpreted that the data is less varied.

4.2 Panel Data Result

Data processing is done with panel data analysis using three methods, namely Common Effect, Fixed Effect, and Random Effect. Of the three methods, the best method will be chosen to be used as a statistical test. The data used in this study are economic growth as the dependent variable and physical special allocation funds, road length infrastructure, domestic investment, and household consumption that has telecommunications expenditure as an independent variable. The results of panel data processing are as follows

4.2.1 Common Effect Model

The Common Effect Regression Model method aims to estimate panel data in the simplest way. This technique combines time series and cross-section data without regard to differences between time or individuals. Model estimation is done using the Ordinary Least Square (OLS) method. (Widarjono, 2009)

Table 4. 2 *Common Effect*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-159.3090	43.23837	-3.684435	0.0003
LOG(X1)	3.218261	0.746721	4.309857	0.0000
LOG(X2)	-1.198672	0.789669	-1.517943	0.1314
LOG(X3)	-0.127581	0.333595	-0.382444	0.7028
LOG(X4)	7.303553	2.317346	3.151689	0.0020
R-squared	0.142094			
F-statistic	5.424339			
Prob(F-statistic)	0.000450			

Source: Processed data by eviews 12

4.2.2 Fixed Effect Model

The Fixed Effect model assumes that each individual has a different intercept value, while the slope remains the same for all individuals. This technique utilizes dummy variables to describe the intercept differences between individuals.

Table 4. 3 *Fixed Effect*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-327.2213	69.98958	-4.675286	0.0000
LOG(X1)	2.864949	1.053042	2.720642	0.0077
LOG(X2)	0.233811	3.457546	0.067624	0.9462
LOG(X3)	1.423877	0.749301	1.900274	0.0603
LOG(X4)	16.82627	3.963750	4.245037	0.0000

Advanced Table 4. 3 *Fixed Effect*

R-squared	0.632144
F-statistic	4.551581
Prob(F-statistic)	0.000000

Source : Processed data by eviews 12

4.2.3 Random Effect Model

This method is used to estimate panel data by considering the possibility of a relationship between residuals based on time and individuals. This approach assumes that each subject has a different intercept. This model is very useful when individual samples are randomly selected and are considered representative of the population as a whole.

Table 4. 4 *Random Effect*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-231.8621	47.66623	-4.864284	0.0000
LOG(X1)	3.700835	0.785373	4.712202	0.0000
LOG(X2)	-1.241665	1.005072	-1.235399	0.2189
LOG(X3)	0.197765	0.416045	0.475346	0.6353
LOG(X4)	11.22733	2.645156	4.244487	0.0000
R-squared	0.200147			
F-statistic	8.195024			
Prob(F-statistic)	0.000006			

Source: Processed data by eviews 12

After testing the Common Effect, Fixed Effect, and Random Effect methods, the next step is to determine the best model. Model selection in a study must be carried out based on appropriate statistical considerations. This aims to obtain efficient and accurate estimates..

4.3 Model Suitability Test

The model selection used in research must be made by considering statistical aspects. Based on the previous description, there are three estimation techniques in panel data analysis, namely Common Effect, Fixed Effect, and Random Effect. To determine the most suitable model, two methods are used, namely the Chow Test (F-statistic test) and the Hausman test

4.3.1 Chow Test

The **table 4.5** below presents the results of calculations using the Chow Test.

Table 4. 5 Chow Test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	3.956166	(33,98)	0.0000
Cross-section Chi-square	115.165171	33	0.0000

Source : Processed data by eviews 12 H0 : Common Effect

H1: Fixed Effect

Based on the results obtained, the Cross-section chi-square probability value is 0.0000 <0.05 or alpha (5%), which means that H0 is rejected, so it can be concluded that the model uses a Fixed Effect.

4.3.2 Hausman Test

The **table 4.6** below presents the results of calculations using the Hausman Test..

Table 4. 6 Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	16.866925	4	0.0021

Source : Processed data by eviews 12 H0 : Random Effect

H1: Fixed Effect

Based on the results obtained, the cross-section random probability value is 0.0021 <0.05 or alpha (5%), which means that H0 is rejected, so it can be concluded that the model uses a Fixed Effect.

4.3.3 Fixed Effect Panel Regression Model

The **table 4.7** below presents the calculation results of Fixed Effect Panel Regression Model

Table 4. 7 *Fixed Effect Panel Regression Model*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-327.2213	69.98958	-4.675286	0.0000
LOG(X1)	2.864949	1.053042	2.720642	0.0077
LOG(X2)	0.233811	3.457546	0.067624	0.9462
LOG(X3)	1.423877	0.749301	1.900274	0.0603
LOG(X4)	16.82627	3.963750	4.245037	0.0000

Advanced Table 4. 7 ***Fixed Effect Panel Regression Model***

R-squared	0.632144
F-statistic	4.551581
Prob(F-statistic)	0.000000

Source : Processed data by eviews 12

Fixed effect multiple regression model on economic growth:

$$Yit = \alpha i + \beta 1 LogX1it + \beta 2 LogX2it + \beta 3 LogX3it + \beta 4 LogX4it + eit$$

Where:

Y = Economic Growth (percent)

LogX1 = Physical Special Allocation Fund (thousand rupiah)

LogX2 = Road Length Infrastructure (kilometers)

LogX3 = Domestic Investment (billion rupiah)

LogX4 = Household Consumption with Telecommunication Expenditure

(rupiah) e = Residual (error)

i = Observation

t = Time (year)

αi = constant

$\beta 1$ $\beta 2$ $\beta 3$ $\beta 4$ = multiple regression coefficient

Yit = -327.2213 + 2.864949 + 0.233811 + 1.423877 + 16.82627 + eit

4.4 Hypothesis Testing

4.4.1 Simultaneous Test (Uji F)

Based on the results of the data above, the probability value of F is 0.000000 <0.1 or alpha (10%) which means H0 is rejected. So with this, it can be concluded that the independent variables simultaneously affect the dependent variable.

4.4.2 Signification Test of Independent Variable (Uji t)

a) Physical Special Allocation Funds

Based on the data above, the probability value is 0.0077 <0.01 which means H0 is rejected. So with this, it can be concluded that the Physical Special Allocation Fund affects Economic Growth.

b) Road Length Infrastructure

Based on the data above, the probability value is 0.9462> 0.1 which means H0 is accepted. So with this, it can be concluded that Road Length Infrastructure does not affect Economic Growth.

c) Domestic Investment

Based on the data above, the probability value is 0.0603 < 0.1 or which means H0 is rejected. So with this, it can be concluded that the Domestic Investmen affects Economic Growth.

d) Household Consumption with Telecommunication Expenditure

Based on the data above, the probability value is 0.0000 <0.01 which means H0 is rejected. So with this, it can be concluded that Household Consumption that has

Telecommunications Expenditures affects Economic Growth.

4.4.3 Determinan Coefficient (R^2).

Based on the results obtained, the R-Squared value in the panel data regression model using the Fixed Effect model method is 0.632144. it can be concluded that the variation in the model is 63.21%. So with this, the variation in the Physical Special Allocation Fund variable, Road Length Infrastructure, Domestic Investment, and Household Consumption with Telecommunications Expenditure is able to explain the variation in the Economic Growth variable. Meanwhile, the value of 36.79% is explained by other factors that are not included in the model.

4.5 Interpretation of Result

$$Y = -327.2213 + 2.864949X1 + 0.233811X2 + 1.423877X3 + 16.82627X4 + eit$$

4.5.1 Physical Special Allocation Funds

Based on the results of the analysis, the coefficient of the physical special allocation fund variable is 2.864949 and has a significant positive effect on economic growth. Therefore, it can be interpreted that if the special allocation fund increases by 1%, it will increase economic growth by 0.0286%. This is in accordance with the hypothesis because the Special Allocation Fund (Physical Special Allocation Funds) has a positive impact on economic growth, especially through improving the quality of infrastructure and public services in the regions. With a well-targeted allocation of funds, Physical Special Allocation Funds is able to support the development of priority sectors, such as education, health, and transportation, which in turn boosts productivity and local economic activity. These results are in

line with research by Alifah & Kurniawati (2024), which states that an increase in the Special Allocation Fund will result in significant economic development. This is because most of the Physical Special Allocation Funds are set aside for education and health facilities, which are likely to be prioritized by local governments this year. Physical Special Allocation Funds is associated with things that directly drive economic growth, such as roads and bridges.

4.5.2 Road Lenght Infrastructure

Based on the results of the analysis, the coefficient of the road infrastructure length variable is 0.233811 and does not affect economic growth. This implies that its increase or decrease does not influence economic growth. This finding contradicts the hypothesis. This result aligns with the study by Syahputra et al. (2021), which found that in the case of Subulussalam City, road infrastructure development has not yet influenced economic growth. This is due to several structural and geographical factors related to road infrastructure in Indonesia. As an archipelagic country, Indonesia has a unique geographical characteristic in which inter-regional connectivity relies more heavily on sea and air transportation rather than land transportation Hill (2022). Consequently, road development does not immediately produce a widespread impact on national economic growth, particularly in isolated or less industrialized regions. In addition, disparities in development and industrialization among regions cause road infrastructure to benefit only certain areas, without generating reciprocal advantages across regions. In many cases, road connectivity functions unidirectionally, supporting distribution from one side without enhancing economic activity on the other. Furthermore, road

infrastructure requires time to deliver a significant economic impact, as its effect tends to be long-term and depends on support from other productive sectors World Bank (2021). Therefore, although roads are theoretically a crucial element in economic development, their effectiveness in the Indonesian context remains limited by geographical constraints, infrastructure quality, and integration with other economic sectors.

4.5.3 Domestic Investment

Based on the analysis results, the coefficient of the domestic investment variable is 1.423877 and has an effect on economic growth. Therefore, it can be interpreted that if domestic investment increases by 1%, economic growth will increase by 0,142%. This can occur because domestic investment plays an important role in increasing production capacity, creating job opportunities, and driving overall economic activity. In other words, the flow of funds into productive sectors through domestic investment can strengthen the economic foundation and boost national output. This finding is in line with the hypothesis and is consistent with the study by Kurniawati and Islami (2022), which states that FDI and domestic investment have a significant impact on economic growth in both the short and long term.

4.5.4 Household Consumption with Telecommunication Expenditure

Based on the analysis results, the coefficient of the household consumption variable with telecommunication expenditures is 16.82627, showing a positive and significant impact on economic growth. This implies that if telecommunication-related household consumption increases by 1%, economic growth will increase by

0,168%. This finding supports the hypothesis, as improved telecommunications access enables households and businesses to enhance efficiency and productivity. Smooth communication facilitates business coordination, access to information, and faster decision-making. This result is also in line with Novalia (2024), who stated that increasing household consumption for telecommunications significantly drives economic growth. The telecommunications sector provides fast access to information and supports business activities, leading to economic expansion.

CHAPTER V

CONCLUSION

5.1 Conclusion

Based on the data analysis and hypothesis testing presented in Chapter IV, the following conclusions can be drawn:

1. The Physical Special Allocation Fund, Road Infrastructure Length, Domestic Investment, and Household Consumption with Telecommunication Expenditures simultaneously influence economic growth.
2. The Physical Special Allocation Fund has a significant positive effect on economic growth. This aligns with the hypothesis, as the Special Allocation Fund (Physical Special Allocation Funds) positively impacts economic growth, particularly by improving the quality of infrastructure and public services in the regions. Properly targeted funding allocation enables Physical Special Allocation Funds to support the development of priority sectors such as education, health, and transportation, ultimately boosting productivity and local economic activity.
3. The length of road infrastructure does not have a significant effect on economic growth. This is due to Indonesia's geographical characteristics as an archipelagic country, regional development disparities, and the suboptimal utilization of roads in supporting economic centers.
4. Domestic Investment has a significant positive effect economic growth. This

support the hypothesis, because domestic investment plays an important role in increasing production capacity, creating job opportunities, and driving overall economic activity.

5. Household Consumption with Telecommunication Expenditures has a significant positive effect on economic growth. This supports the hypothesis, as improved access to telecommunications enables households and businesses to enhance efficiency and productivity.

5.2 Implication

1. The Physical Special Allocation Fund, Road Infrastructure Length, Domestic Investment, and Household Consumption with Telecommunication Expenditures collectively contribute to economic growth. This implies the need for an integrated approach in development planning to optimize the interaction between these variables. The government should enhance cross-sectoral coordination to ensure synergy in policy and investment.
2. A more targeted Physical Special Allocation Funds allocation, particularly for priority sectors such as education, health, and transportation, is essential. Optimizing Physical Special Allocation Funds management can improve the quality of public services and regional infrastructure, ultimately enhancing productivity and regional competitiveness. More transparent and focused Physical Special Allocation Funds management can improve public services and infrastructure, fostering productivity and local economic growth.
3. The findings on road infrastructure highlight the need for further

evaluation of the location and quality of road development. The government should prioritize road development in strategic areas that support key economic centers to maximize its impact on economic growth. A needs-based approach tailored to the specific conditions of each region can improve the effectiveness of infrastructure investment, especially by taking into account Indonesia's geographical characteristics as an archipelagic country and the disparities in regional development.

4. The positive impact of domestic investment on economic growth suggests that the government should prioritize policies that support local investment. This includes simplifying regulations, offering incentives, and improving infrastructure to boost production, job creation, and sustainable economic growth.
5. Household consumption with telecommunication expenditures highlights the importance of expanding digital infrastructure and telecommunication access. The government and private sector should collaborate to expand telecommunication network coverage, particularly in remote areas, to support household and business productivity. The development of the telecommunications sector can accelerate the transition toward a digital economy.

REFERENCES

Alifah, S. M., & Kurniawati, L. (2024). Economics And Digital Business Review Pengaruh Pendapatan Asli Daerah , Dana Alokasi Umum Dan Dana Alokasi Khusus And Belanja Modal Di Provinsi Sulawesi Selatan 2019-2021. *Economics And Digital Business Review*, *5*(2), 629–640.

Angelina, D., & Wahyuni, K. T. (2021). Pengaruh Infrastruktur Ekonomi Dan Sosial Terhadap Pertumbuhan Ekonomi Indonesia, 2015-2019. *Seminar Nasional Official Statistics*, *1*(1), 733–742. Https://Doi.Org/10.34123/Semnasoffstat.V2021i1.1025

Asiyan, S. (2020). Pengaruh Penanaman Modal Dalam Negeri, Penanaman Modal Asing, Dan Ekspor Terhadap Pertumbuhan Ekonomi Jawa Timur. *Jurnal Pendidikan Ekonomi (Jupe)*, *1*(3), 1–18.

Fauzyni, W. (2013). *Analisis Pengaruh Pendapatan Asli Daerah (Pad), Dana Alokasi Khusus (Physical Special Allocation Funds), Dana Bagi Hasil (Dbh) Pajak/Bukan Pajak Terhadap Pertumbuhan Ekonomi Kabupaten/Kota Provinsi Jawa Tengah 2003-2011*. Universitas Islam Negeri (Uin) Syarif Hidayatullah Jakarta.

Ghozali, I. (2005). *Aplikasi Analisis Multivariate Dengan Program Spss* (3rd Ed.). Badan Penerbit Undip.

Hulu, P. K., & Wahyuni, K. T. (2021). Kontribusi Pembangunan Infrastruktur Terhadap Pertumbuhan Ekonomi Dan Ketimpangan Pendapatan Di Indonesia Tahun 2010-2019.

Seminar Nasional Official Statistics, *1*(1), 603–612. Https://Doi.Org/10.34123/Semnasoffstat.V2021i1.979

Kurniawan, B., Sunarya, S. R., Naofal, F., & Sudarjah, G. M. (2021). Indeks Harga Ekspor, Inflasi, Pengangguran Serta Pengaruhnya And Pendapatan Nasional Indonesia Dan Korea. *Jurnal Riset Ilmu Ekonomi*, *1*(3), 120–130. Https://Doi.Org/10.23969/Jrie.V1i3.19

Kurniawati, D. L., & Islami, F. S. (2022). Analisis Pengaruh PMA, PMDN Dan Ekspor Migas-Nonmigas Terhadap Pertumbuhan Ekonomi Indonesia. *Transekonomika: Akuntansi, Bisnis Dan Keuangan*, *2*(1), 13–28. Https://Doi.Org/10.55047/Transekonomika.V2i1.98

Ma'rifah, A. (2022). The Effect Of Infrastructure Development On Economic Growth. *Efficient: Indonesian Journal Of Development Economics*, *5*(3), 230–241. Https://Doi.Org/10.15294/Efficient.V5i3.54394

Ma'ruf, A., & Wihastuti, L. (2008). Pertumbuhan Ekonomi Indonesia: Determinan Dan Prospeknya. *Jurnal Ekonomi Dan Studi Pembangunan*, *9*(1), 44–55.

Novalia, I. (2024). Pengaruh Investasi, Telekomunikasi Dan Teknologi Informasi Terhadap Pertumbuhan Ekonomi Di Indonesia [1]inda Novalia Universitas Tanjungpura, Indonesia. *Jurnal Pembangunan Dan Pemerataan*, *13*(3), 1–18.

Oktaviani, S. (2020). *Pengaruh Jumlah Pengguna Layanan Dan Konsumsi Rumah Tangga Untuk Telekomunikasi Dan Pertumbuhan Ekonomi Di Indonesia*. Universitas Jember.

Perkasa, L. S. P., Kawung, G. M. V, & Tumangkeng, S. Y. L. (2021). Analisis Pengaruh

Dana Alokasi Umum Dan Dana Alokasi Khusus Terhadap Pertumbuhan Ekonomi Di Provinsi Sulawesi Utara. *Jurnal Emba: Jurnal Riset Ekonomi, Manajemen, Bisnis Dan Akuntansi*, *9*(1), 503–514.

Rizky, R. L., Agustin, G., & Mukhlis, I. (2016). Pengaruh Penanaman Modal Asing, Penanaman Modal Dalam Negeri, Dan Belanja Modal terhadap Pertumbuhan Ekonomi Di Provinsi Jambi. *Jurnal Ekonomi Dan Studi Pembangunan*, *8*(1), 9–16. Https://Doi.Org/10.22437/Pdpd.V5i2.4099

Sulaeman, A. S., & Silvia, V. (2019). Pendapatan Asli Daerah,Transfer Daerah, Dan Belanja Modal, Pengaruhnya terhadap Pertumbuhan Ekonomi Di Indonesia. *Jurnal Aplikasi Akuntansi*, *4*(1), 97–112. Https://Doi.Org/10.29303/Jaa.V4i1.61

Syahputra, T. S. A., Purba, E., & Damanik, D. (2021). Pengaruh Infrastruktur Terhadap Pertumbuhan Ekonomi Di Kota Subulussalam. *Ekuilnomi : Jurnal Ekonomi Pembangunan Vol.*, *3*(2), 104–114.

Widarjono, A. (2018). *Ekonometrika:Pengantar Dan Aplikasinya Disertai Panduan Eviews* (5th Ed.). Upp Stim Ykpn.

Yovani, D. S., & Irfan, M. (2024). Analisis Pengaruh Infrastruktur Terhadap Pertumbuhan Ekonomi Di Sulawesi Selatan. *Media Riset Ekonomi Pembangunan*, 196–210. Https://Etd.Umm.Ac.Id/Id/Eprint/8051/%0ahttps://Etd.Umm.Ac.Id/Id/Eprint/8051/3/Bab Ii.Pdf

APPENDIX

Appendix I Research Data

Province	Year	PE	Physical Special Allocation Funds	IPJ	PMDN	KRTPT
ACEH	2020	-0,37	290254887	23632	8241,10	4600377,72
ACEH	2021	2,81	322489506	23650	7904,70	4661678,28
ACEH	2022	4,21	275190068	23660	4424,20	4917624,46
ACEH	2023	4,23	351422617	23660	8883,30	5339208,00
SUMATERA UTARA	2020	-1,07	360697801	40956	18189,50	4711151,41
SUMATERA UTARA	2021	2,61	387905400	40739	18484,50	4544866,18
SUMATERA UTARA	2022	4,73	330878059	40765	22789,20	4881078,94
SUMATERA UTARA	2023	5,01	427465166	40979	21574,00	5452951,00
SUMATERA BARAT	2020	-1,61	304577061	22323	3106,20	5227120,65
SUMATERA BARAT	2021	3,29	282359574	22649	4183,70	5244390,45
SUMATERA BARAT	2022	4,36	279978313	20999	2559,80	5640747,23
SUMATERA BARAT	2023	4,62	387510310	22602	4488,20	6037493,00
RIAU	2020	-1,13	256771909	24115	34117,80	5379777,19
RIAU	2021	3,36	308779222	24293	24997,80	5244072,34
RIAU	2022	4,55	301685212	24206	43062,00	5774366,46
RIAU	2023	4,21	303091172	24206	48243,30	6572426,00
JAMBI	2020	-0,51	186307596	13131	3511,70	4443405,79
JAMBI	2021	3,70	212067401	13141	6204,20	4478944,91
JAMBI	2022	5,12	232156860	13202	8882,70	4972120,28
JAMBI	2023	4,66	348802566	13353	8939,00	5836743,00

SUMATERA SELATAN	2020	-0,11	187489244	19606	15824,50	4174263,50
SUMATERA SELATAN	2021	3,58	243467083	19606	16266,90	4282675,68
SUMATERA SELATAN	2022	5,23	211287490	19587	23526,00	4626365,08
SUMATERA SELATAN	2023	5,08	276358935	19838	25602,40	5083281,00
BENGKULU	2020	-0,02	139105613	9191	5399,20	4409226,67
BENGKULU	2021	3,27	201289535	9191	4923,50	4245980,14
BENGKULU	2022	4,31	217434889	9228	6957,30	4689885,28
BENGKULU	2023	4,26	281963869	9228	7218,70	5302230,00
LAMPUNG	2020	-1,66	268350583	20715	7120,50	3793327,11
LAMPUNG	2021	2,77	336811309	20759	10513,20	3877266,46
LAMPUNG	2022	4,28	345211328	20765	5809,20	4166400,59
LAMPUNG	2023	4,55	291760113	20767	7625,80	4582242,00

KEP. BANGKA BELITUNG	2020	-2,29	170907728	5418	1863,80	5694152,41
KEP. BANGKA BELITUNG	2021	5,05	153661573	5783	3677,40	5534188,02
KEP. BANGKA BELITUNG	2022	4,40	143245008	5891	6309,00	6231469,07
KEP. BANGKA BELITUNG	2023	4,38	170824372	5891	7961,40	6819768,00
KEP. RIAU	2020	-3,80	205278611	5686	14249,00	6370404,74
KEP. RIAU	2021	3,43	195771881	5686	9768,70	6636732,59
KEP. RIAU	2022	5,09	166731531	5688	4817,40	6626465,84
KEP. RIAU	2023	5,20	313990759	5688	8856,60	7848561,00
DKI JAKARTA	2020	-2,39	26676670	6485	42954,70	7954511,86
DKI JAKARTA	2021	3,55	76296849	6485	54708,20	8128863,56
DKI JAKARTA	2022	5,25	37291510	6485	89223,60	9156272,74
DKI JAKARTA	2023	4,96	4168977	6485	95202,10	10665373,00
JAWA BARAT	2020	-2,52	849404806	28045	51400,50	5041747,53
JAWA BARAT	2021	3,74	820786986	28178	59948,50	5042941,48
JAWA BARAT	2022	5,45	640686447	28393	80808,30	5409408,73
JAWA BARAT	2023	5,00	577847874	29756	88012,90	6163600,00
JAWA TENGAH	2020	-2,65	366106068	30667	30606,10	3959031,29
JAWA TENGAH	2021	3,33	470376477	30544	31311,20	3975611,90
JAWA TENGAH	2022	5,31	454238695	30819	24992,30	4386872,65
JAWA TENGAH	2023	4,98	426632402	31678	32987,20	4572603,00
DI YOGYAKARTA	2020	-2,67	118007504	4338	2683,40	4887552,67
DI YOGYAKARTA	2021	5,58	163597355	4338	2761,30	4966238,97
DI YOGYAKARTA	2022	5,15	143414048	4449	2275,00	5692577,92
DI YOGYAKARTA	2023	5,07	147695733	4449	5015,50	6469830,00
JAWA TIMUR	2020	-2,33	586933867	42450	55660,60	4023024,75

JAWA TIMUR	2021	3,56	1015885369	42521	52552,20	4116665,42
JAWA TIMUR	2022	5,34	614858314	42422	65355,90	4500675,63
JAWA TIMUR	2023	4,95	540992405	42466	74937,40	5015394,00
BANTEN	2020	-3,39	101259658	5712	31145,70	6274392,68
BANTEN	2021	4,49	149152601	5712	25989,50	5883642,54
BANTEN	2022	5,03	152421552	5715	31283,90	6336590,28
BANTEN	2023	4,81	146012230	6128	37971,70	7188547,00
BALI	2020	-9,34	66944449	8805	5432,70	5801002,89
BALI	2021	-2,46	142178961	8787	6355,20	5684950,69
BALI	2022	4,84	82933262	8656	6002,10	6054777,00
BALI	2023	5,71	119564650	8864	6950,80	6942290,00
NUSA TENGGARA BARAT	2020	-0,62	357195758	8504	6582,40	3998253,90

NUSA TENGGARA BARAT	2021	2,30	417655234	8504	9090,50	4243257,73
NUSA TENGGARA BARAT	2022	6,95	488642226	8509	11031,50	4309553,61
NUSA TENGGARA BARAT	2023	1,80	341137435	8509	30766,20	4617819,00
NUSA TENGGARA TIMUR	2020	-0,84	549996205	23656	3028,50	3821772,11
NUSA TENGGARA TIMUR	2021	2,52	484558530	23656	3742,60	3751413,73
NUSA TENGGARA TIMUR	2022	3,05	533531358	24050	3459,30	4220805,40
NUSA TENGGARA TIMUR	2023	3,52	474830817	24050	3407,20	4605962,00
KALIMANTAN BARAT	2020	-1,82	317953542	18315	9256,50	4785986,91
KALIMANTAN BARAT	2021	4,80	429933644	18315	10773,40	4692712,61
KALIMANTAN BARAT	2022	5,07	314669121	18284	9382,90	5121370,09
KALIMANTAN BARAT	2023	4,46	370387257	18505	14892,00	5582538,00
KALIMANTAN TENGAH	2020	-1,41	317313879	18800	3710,00	5025975,12
KALIMANTAN TENGAH	2021	3,59	301946031	18809	6359,80	5048915,97
KALIMANTAN TENGAH	2022	6,45	255831358	18906	6556,80	5322470,58
KALIMANTAN TENGAH	2023	4,14	320308932	18923	8779,50	5779015,00
KALIMANTAN SELATAN	2020	-1,82	135871739	13440	4286,30	5011479,10
KALIMANTAN SELATAN	2021	3,48	289363264	13440	11003,90	5043710,48

KALIMANTAN SELATAN	2022	5,11	267146928	13477	12310,40	5317314,90
KALIMANTAN SELATAN	2023	4,84	314211620	13648	14909,40	5777021,00
KALIMANTAN TIMUR	2020	-2,90	222219791	12587	25934,00	6662121,52
KALIMANTAN TIMUR	2021	2,55	318456830	13270	30297,40	6423866,49
KALIMANTAN TIMUR	2022	4,48	255545404	13407	39595,60	6962304,81
KALIMANTAN TIMUR	2023	6,22	190152584	13375	52171,70	7730635,00
KALIMANTAN UTARA	2020	-1,09	170888819	4914	2235,20	6467737,13
KALIMANTAN UTARA	2021	3,99	149959801	4914	3792,50	6118321,47
KALIMANTAN UTARA	2022	5,32	143030481	4973	7526,40	6554135,66
KALIMANTAN UTARA	2023	4,94	179008533	4973	8199,10	7282464,00
SULAWESI UTARA	2020	-0,99	280933281	10058	3005,60	4703185,17
SULAWESI UTARA	2021	4,16	288927382	10091	3480,00	4552948,91
SULAWESI UTARA	2022	5,42	345898871	10211	5042,10	4728586,44
SULAWESI UTARA	2023	5,48	346698313	10309	7698,20	5062041,00
SULAWESI TENGAH	2020	4,86	406299782	16908	5261,30	4372982,33
SULAWESI TENGAH	2021	11,68	397757337	16908	3012,30	4280614,78

SULAWESI TENGAH	2022	15,22	418473747	16952	3758,60	4592027,21
SULAWESI TENGAH	2023	11,91	410561824	16952	4772,50	5122761,00
SULAWESI SELATAN	2020	-0,71	296515454	30598	9142,00	4523972,45
SULAWESI SELATAN	2021	4,64	474733321	30397	12075,40	4440875,30
SULAWESI SELATAN	2022	5,10	321993568	30206	7528,00	4783129,77
SULAWESI SELATAN	2023	4,51	314836937	30357	11468,30	5368029,00
SULAWESI TENGGARA	2020	-0,65	267424647	12987	2865,70	4516011,97
SULAWESI TENGGARA	2021	4,10	364737486	12867	4334,20	4419680,20
SULAWESI TENGGARA	2022	5,53	295484206	12802	7596,00	4794937,03
SULAWESI TENGGARA	2023	5,35	386667037	13066	7734,60	5209446,00
GORONTALO	2020	-0,02	87918519	5506	683,60	4365954,35
GORONTALO	2021	2,40	133978776	5513	1004,30	4518515,39
GORONTALO	2022	4,04	160143041	5516	1113,50	4777728,88
GORONTALO	2023	4,50	165686478	5516	3960,10	5273676,00
SULAWESI BARAT	2020	-2,34	249144707	6154	252,90	3989704,76
SULAWESI BARAT	2021	2,57	227570658	6175	395,30	3745547,29
SULAWESI BARAT	2022	2,31	247253991	6180	1313,30	4235030,38
SULAWESI BARAT	2023	5,25	339971085	5648	2011,10	4600653,00
MALUKU	2020	-0,91	248533177	10676	474,80	5257574,10
MALUKU	2021	3,63	393321668	10266	2939,70	4933086,06
MALUKU	2022	5,31	328515601	10373	611,00	5406138,91
MALUKU	2023	5,21	407724186	9364	1904,50	5830358,00
MALUKU UTARA	2020	5,39	295023233	7354	662,10	5071940,66
MALUKU UTARA	2021	16,79	359286345	7354	2665,30	4870930,99
MALUKU UTARA	2022	22,94	378688442	7360	3414,90	5085367,72
MALUKU UTARA	2023	20,49	383741336	7360	6901,00	6108317,00
PAPUA BARAT	2020	-0,76	179635824	12522	1925,40	6140468,67
PAPUA BARAT	2021	-0,51	277903719	13015	635,60	6060732,17

PAPUA BARAT	2022	2,01	356968850	13028	2139,10	6327027,44
PAPUA BARAT	2023	3,91	185690056	7533	1261,90	6816752,00
PAPUA	2020	2,39	273534832	20901	2722,20	5783601,89
PAPUA	2021	15,16	422868900	21068	910,80	6040474,78
PAPUA	2022	8,97	417888971	21562	1311,80	6975568,21
PAPUA	2023	5,22	195899501	8976	1174,10	6328085,00

Appendix II Descriptive Statistics

	PE	DAK_FISIK	IPJ	PMDN	KRTPT
Mean	3.535074	3.01E+08	15967.70	15337.13	5349587.
Median	4.220000	2.93E+08	13171.50	7169.600	5077611.
Maximum	22.94000	1.02E+09	42521.00	95202.10	10665373
Minimum	-9.340000	4168977.	4338.000	252.9000	3745547.
Std. Dev.	4.267231	1.54E+08	10099.95	20023.73	1115634.
Skewness	1.193642	1.347308	0.950370	2.123943	1.432149
Kurtosis	8.023110	6.857743	3.225380	7.208248	6.460712
Jarque-Bera	175.2743	125.4778	20.76043	202.6053	114.3574
Probability	0.000000	0.000000	0.000031	0.000000	0.000000
Sum	480.7700	4.10E+10	2171607.	2085850.	7.28E+08
Sum Sq. Dev.	2458.250	3.22E+18	1.38E+10	5.41E+10	1.68E+14
Observations	136	136	136	136	136

Appendix III

Common Effect

Dependent Variable: PE
Method: Panel Least Squares
Date: 05/10/25 Time: 10:37
Sample: 2020 2023
Periods included: 4
Cross-sections included: 34
Total panel (balanced) observations: 136

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-159.3090	43.23837	-3.684435	0.0003
LOG(DAK FISIK)	3.218261	0.746721	4.309857	0.0000
LOG(IPJ)	-1.198672	0.789669	-1.517943	0.1314
LOG(PMDN)	-0.127581	0.333595	-0.382444	0.7028
LOG(KRTPT)	7.303553	2.317346	3.151689	0.0020

Root MSE	3.937889	R-squared	0.142094
Mean dependent var	3.535074	Adjusted R-squared	0.115898
S.D. dependent var	4.267231	S.E. of regression	4.012335
Akaike info criterion	5.652696	Sum squared resid	2108.947
Schwarz criterion	5.759779	Log likelihood	-379.3833
Hannan-Quinn criter.	5.696212	F-statistic	5.424339
Durbin-Watson stat	0.870494	Prob(F-statistic)	0.000450

Appendix IV

Fixed Effect

Dependent Variable: PE
Method: Panel Least Squares
Date: 05/10/25 Time: 10:39
Sample: 2020 2023
Periods included: 4
Cross-sections included: 34
Total panel (balanced) observations: 136

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-327.2213	69.98958	-4.675286	0.0000
LOG(DAK_FISIK)	2.864949	1.053042	2.720642	0.0077
LOG(IPJ)	0.233811	3.457546	0.067624	0.9462
LOG(PMDN)	1.423877	0.749301	1.900274	0.0603
LOG(KRTPT)	16.82627	3.963750	4.245037	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Root MSE	2.578592	R-squared	0.632144
Mean dependent var	3.535074	Adjusted R-squared	0.493259
S.D. dependent var	4.267231	S.E. of regression	3.037659
Akaike info criterion	5.291187	Sum squared resid	904.2822
Schwarz criterion	6.105017	Log likelihood	-321.8007
Hannan-Quinn criter.	5.621907	F-statistic	4.551581
Durbin-Watson stat	2.311867	Prob(F-statistic)	0.000000

Appendix V

Random Effect

Dependent Variable: PE
Method: Panel EGLS (Cross-section random effects)
Date: 05/10/25 Time: 10:40
Sample: 2020 2023
Periods included: 4
Cross-sections included: 34
Total panel (balanced) observations: 136
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-231.8621	47.66623	-4.864284	0.0000
LOG(DAK FISIK)	3.700835	0.785373	4.712202	0.0000
LOG(IPJ)	-1.241665	1.005072	-1.235399	0.2189
LOG(PMDN)	0.197765	0.416045	0.475346	0.6353
LOG(KRTPT)	11.22733	2.645156	4.244487	0.0000

Effects Specification	S.D.	Rho
Cross-section random	2.455450	0.3952
Idiosyncratic random	3.037659	0.6048

Weighted Statistics

Root MSE	3.124280	R-squared	0.200147
Mean dependent var	1.859630	Adjusted R-squared	0.175724
S.D. dependent var	3.506287	S.E. of regression	3.183346
Sum squared resid	1327.513	F-statistic	8.195024
Durbin-Watson stat	1.417640	Prob(F-statistic)	0.000006

Unweighted Statistics

R-squared	0.103315	Mean dependent var	3.535074
Sum squared resid	2204.275	Durbin-Watson stat	0.853766

Appendix VI Chow Test

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	3.956166	(33,98)	0.0000
Cross-section Chi-square	115.165171	33	0.0000

Cross-section fixed effects test equation:
Dependent Variable: PE
Method: Panel Least Squares
Date: 05/10/25 Time: 10:40
Sample: 2020 2023
Periods included: 4
Cross-sections included: 34
Total panel (balanced) observations: 136

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-159.3090	43.23837	-3.684435	0.0003
LOG(DAK_FISIK)	3.218261	0.746721	4.309857	0.0000
LOG(IPJ)	-1.198672	0.789669	-1.517943	0.1314
LOG(PMDN)	-0.127581	0.333595	-0.382444	0.7028
LOG(KRTPT)	7.303553	2.317346	3.151689	0.0020

Root MSE	3.937889	R-squared	0.142094
Mean dependent var	3.535074	Adjusted R-squared	0.115898
S.D. dependent var	4.267231	S.E. of regression	4.012335
Akaike info criterion	5.652696	Sum squared resid	2108.947
Schwarz criterion	5.759779	Log likelihood	-379.3833
Hannan-Quinn criter.	5.696212	F-statistic	5.424339
Durbin-Watson stat	0.870494	Prob(F-statistic)	0.000450

Appendix VII

Hausman Test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	16.866925	4	0.0021

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LOG(DAK FISIK)	2.864949	3.700835	0.492086	0.2334
LOG(IPJ)	0.233811	-1.241665	10.944458	0.6556
LOG(PMDN)	1.423877	0.197765	0.388359	0.0491
LOG(KRTPT)	16.826267	11.227329	8.714468	0.0579

Cross-section random effects test equation:
Dependent Variable: PE
Method: Panel Least Squares
Date: 05/10/25 Time: 10:41
Sample: 2020 2023
Periods included: 4
Cross-sections included: 34
Total panel (balanced) observations: 136

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-327.2213	69.98958	-4.675286	0.0000
LOG(DAK FISIK)	2.864949	1.053042	2.720642	0.0077
LOG(IPJ)	0.233811	3.457546	0.067624	0.9462
LOG(PMDN)	1.423877	0.749301	1.900274	0.0603
LOG(KRTPT)	16.82627	3.963750	4.245037	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Root MSE	2.578592	R-squared	0.632144
Mean dependent var	3.535074	Adjusted R-squared	0.493259
S.D. dependent var	4.267231	S.E. of regression	3.037659
Akaike info criterion	5.291187	Sum squared resid	904.2822
Schwarz criterion	6.105017	Log likelihood	-321.8007
Hannan-Quinn criter.	5.621907	F-statistic	4.551581
Durbin-Watson stat	2.311867	Prob(F-statistic)	0.000000